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PTO/SB/21 (08-03)

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TRANSMITTAL FORM (to be used for all correspondence after initial filing)	Application Number	09/677,698	
	Filing Date	September 28, 2000	
	First Named Inventor	Rajendran Nair	
	Art Unit	2814	
	Examiner Name	Shrinivas H. Rao	
Total Number of Pages in This Submission	65	Attorney Docket Number	42390.P9239

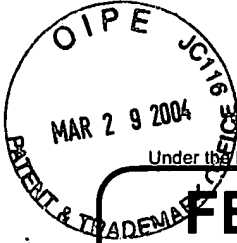
ENCLOSURES (Check all that apply)		
<input checked="" type="checkbox"/> Fee Transmittal Form (2 copies) <input checked="" type="checkbox"/> Fee Attached <input type="checkbox"/> Amendment/Reply <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s) <input type="checkbox"/> Extension of Time Request <input type="checkbox"/> Express Abandonment Request <input type="checkbox"/> Information Disclosure Statement <input type="checkbox"/> Certified Copy of Priority Document(s) <input type="checkbox"/> Response to Missing Parts/Incomplete Application <input type="checkbox"/> Response to Missing Parts under 37 CFR 1.52 or 1.53	<input type="checkbox"/> Drawing(s) <input type="checkbox"/> Licensing-related Papers <input type="checkbox"/> Petition <input type="checkbox"/> Petition to Convert to a Provisional Application <input type="checkbox"/> Power of Attorney, Revocation <input type="checkbox"/> Change of Correspondence Address <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Request for Refund <input type="checkbox"/> CD, Number of CD(s) _____	<input type="checkbox"/> After Allowance communication to Technology Center (TC) <input checked="" type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input type="checkbox"/> Appeal Communication to TC (Appeal Notice, Brief, Reply Brief) <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Status Letter <input type="checkbox"/> Other Enclosure(s) (please identify below):
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Date	March 25, 2004

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FEE TRANSMITTAL for FY 2004

Effective 10/01/2003. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$) 330.00

Complete if Known

Application Number	09/677,698
Filing Date	September 28, 2000
First Named Inventor	Rajendran Nair
Examiner Name	Shrinivas H. Rao
Art Unit	2814
Attorney Docket No.	42390.P9239

METHOD OF PAYMENT (check all that apply)

☒ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None
☒ Deposit Account:

Deposit Account Number: 02-2666
Deposit Account Name: Blakely, Sokoloff, Taylor & Zafman LLP

The Director is authorized to: (check all that apply)
☐ Charge fee(s) indicated below ☒ Credit any overpayments
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FEE CALCULATION

1. BASIC FILING FEE

Large Entity	Small Entity	Fee Code	Fee (\$)	Fee Description	Fee Paid
		1001	770	Utility filing fee	
		1002	340	Design filing fee	
		1003	530	Plant filing fee	
		1004	770	Reissue filing fee	
		1005	160	Provisional filing fee	
SUBTOTAL (1)					(\$)

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

Total Claims: -20** = X =
Independent Claims: -3** = X =
Multiple Dependent: =

Large Entity	Small Entity	Fee Code	Fee (\$)	Fee Description	Fee Paid
		1202	18	Claims in excess of 20	
		1201	86	Independent claims in excess of 3	
		1203	290	Multiple dependent claim, if not paid	
		1204	86	** Reissue independent claims over original patent	
		1205	18	** Reissue claims in excess of 20 and over original patent	
SUBTOTAL (2)					(\$)

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity	Small Entity	Fee Code	Fee (\$)	Fee Description	Fee Paid
		1051	130	2051 65 Surcharge - late filing fee or oath	
		1052	50	2052 25 Surcharge - late provisional filing fee or cover sheet	
		1053	130	1053 130 Non-English specification	
		1812	2,520	1812 2,520 For filing a request for ex parte reexamination	
		1804	920*	1804 920* Requesting publication of SIR prior to Examiner action	
		1805	1,840*	1805 1,840* Requesting publication of SIR after Examiner action	
		1251	110	2251 55 Extension for reply within first month	
		1252	420	2252 210 Extension for reply within second month	
		1253	950	2253 475 Extension for reply within third month	
		1254	1,480	2254 740 Extension for reply within fourth month	
		1255	2,010	2255 1,005 Extension for reply within fifth month	
		1401	330	2401 165 Notice of Appeal	
		1402	330	2402 165 Filing a brief in support of an appeal	330.00
		1403	290	2403 145 Request for oral hearing	
		1451	1,510	1451 1,510 Petition to institute a public use proceeding	
		1452	110	2452 55 Petition to revive - unavoidable	
		1453	1,330	2453 665 Petition to revive - unintentional	
		1501	1,330	2501 665 Utility issue fee (or reissue)	
		1502	480	2502 240 Design issue fee	
		1503	640	2503 320 Plant issue fee	
		1460	130	1460 130 Petitions to the Commissioner	
		1807	50	1807 50 Processing fee under 37 CFR 1.17(q)	
		1806	180	1806 180 Submission of Information Disclosure Stmt	
		8021	40	8021 40 Recording each patent assignment per property (times number of properties)	
		1809	770	2809 385 Filing a submission after final rejection (37 CFR 1.129(a))	
		1810	770	2810 385 For each additional invention to be examined (37 CFR 1.129(b))	
		1801	770	2801 385 Request for Continued Examination (RCE)	
		1802	900	1802 900 Request for expedited examination of a design application	
Other fee (specify) _____					
*Reduced by Basic Filing Fee Paid					
SUBTOTAL (3)					(\$) 330.00

SUBMITTED BY

(Complete if applicable)

Name (Print/Type)	Dennis A. Nicholls	Registration No. (Attorney/Agent)	42,036	Telephone	408-720-8300
Signature	<i>Dennis A. Nicholls</i>	Date	March 25, 2004		

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Socket No.: 42390.P9239

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS AND INTERFERENCES**

In re the application of:)
)
Nair, Rajendran, et al.)
)
Serial No.: 09/677,698) Examiner: Rao, S.
)
Filed: 09/28/ 2000) Art Unit: 2814
)
For: METHOD AND APPARATUS FOR)
WEAK INVERSION MODE MOS)
DECOUPLING CAPACITOR)

APPELLANTS' BRIEF UNDER 37 CFR § 1.192
IN SUPPORT OF APPELLANTS' APPEAL TO THE BOARD OF PATENT
APPEALS AND INTERFERENCES

(REVISED)

Hon. Commissioner for Patents
Mail Stop Appeal Brief – Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Appellants hereby submit this Brief in triplicate in support of an appeal from a final decision of the Examiner, in the above-referenced case. Appellants respectfully request consideration of this appeal by the Board of Patent Appeals and Interference for allowance of the above-referenced patent application.

03/30/2004 FFANAEIA 00000015 09677698

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Serial No. 09/677,698

-1-

42390.P9239

TABLE OF CONTENTS

I. REAL PARTY IN INTEREST	3
II. RELATED APPEALS AND INTERFERENCES.....	3
III. STATUS OF THE CLAIMS	3
IV. STATUS OF AMENDMENTS	4
V. SUMMARY OF THE INVENTION.....	5
VI. ISSUES	6
VII. GROUPING OF CLAIMS	6
VIII. ARGUMENT.....	7
IX. APPENDIX:	18

I. Real Party in Interest

The real party in interest in the present appeal is Intel Corporation, a Delaware Corporation headquartered in Santa Clara, California, the assignee of the present application.

II. Related Appeals and Interferences

There are no related appeals or interferences to appellants' knowledge that would have a bearing on any decision of the Board of Patent Appeals and Interferences.

III. Status of the Claims

Claims 2 through 7 and 20 through 23 stand rejected under 35 U.S.C. 103 over Stein et al. (U.S. Patent No. 4,055,837, hereinafter *Stein*) and Howard (U.S. Patent No. 4,437,139, hereinafter *Howard*) and Dawson et al. (U.S. Patent No. 5,851,891, hereinafter *Dawson*).

IV. Status of Amendments

A first Office Action in the present application was mailed 11/05/2001. A first response with amendment was submitted by the appellants on 03/05/2002, and the amendment was entered. In response to appellants' first response with amendment, an Office Action with a Final Rejection was mailed 06/11/02. Appellants responded by submitting a Request for Continued Examination with amendment on 09/11/2002.

A non-final Office Action was mailed on 11/29/2002. Appellants responded by submitting a response with amendment on 02/28/2003. An Office Action with a Final Rejection was mailed 06/04/2003. Appellants filed a Notice of Appeal on 10/03/2003.

Appellants submitted on 11/19/2003 an original Appeal Brief and an amendment after final rejection under 37 CFR 1.116(b). An Advisory Action/Notice of Defective Brief was mailed on 02/27/2004 which stated that the amendment after final rejection would not be entered, and that therefore the original Appeal Brief was defective.

Appellants therefore submit the present revised Appeal Brief, including the claims as presented in the response with amendment of 02/28/2003.

V. Summary of the Invention

Appellants' disclosure describes a method and apparatus for improvements in a MOS transistor for use in as a decoupling capacitor in an integrated circuit. It is generally possible to connect a MOS transistor as a decoupling capacitor in two ways: connect the gate electrode to the minus power supply trace ("strong inversion mode") or connect the gate electrode to the positive power supply trace ("depletion mode"). This is shown in Figures 2 and 3, respectively. Generally the strong inversion mode configuration has proven the better of the two until recently. As the gate oxide layers have become thinner, leakage currents have become substantial.

Appellants' disclosure describes certain modifications in the structures and materials used in the fabrication of a MOS transistor that permit its use as a superior decoupling capacitor when used in the "depletion mode" circuit configuration. Generally this entails using a diffused gate region material with a reduced work function. Another modification that may be used is to heavily dope the substrate area. One embodiment's MOS transistor is shown in Figure 5, where the gate region 510 is fabricated from platinum silicide (PtSi). Other materials are also disclosed. See specification page 7 line 23 through page 8 line 4. When such a MOS transistor is connected in the "depletion mode" configuration, its performance may justify calling it a "weak inversion mode" capacitor as shown in Figure 6. The Figure 5 MOS transistor when configured as in Figure 6 has superior capacitance-to-voltage characteristics as shown in Figures 7 and 8. Specifically, curve 720 of Figure 7 shows how the "weak

inversion mode” capacitor actually increases in capacitance as the supply voltage decreases, an advantageous property for a decoupling capacitor.

VI. Issues

1. Whether claims 2 through 7 and 20 through 23 are unpatentable under 35 U.S.C. 103 over Stein et al. (U.S. Patent No. 4,055,837) and Howard (U.S. Patent No. 4,437,139) and Dawson et al. (U.S. Patent No. 5,851,891).

VII. Grouping of Claims (Independent Claims **Bolded**)

Group I: Decoupling Capacitor

For the purposes of this appeal claims **2**, 3, 4, 5, 6, 7, **20**, 21, 22, and 23 stand or fall together.

VIII. Argument

A. Claims 2 – 7 and 20 - 23 Are Not Obvious In View of Stein,

Howard, and Dawson

Claims claims 2 through 7 and 20 through 23 stand rejected under 35 U.S.C. 103 over Stein et al. (U.S. Patent No. 4,055,837, hereinafter *Stein*) and Howard (U.S. Patent No. 4,437,139, hereinafter *Howard*) and Dawson et al. (U.S. Patent No. 5,851,891, hereinafter *Dawson*).

To establish a *prima facie* case of obviousness, case law as cited in the MPEP requires three criteria.

First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). MPEP § 706.02(j).

Moreover, the Federal Circuit has recently cautioned that the Patent Office must support its rejections for reasons that are stated on the record that establish why a particular combination would have been motivated by the prior art. It is inadequate to just state in conclusory fashion that just because two elements existed in the prior art, that

someone should have or would have been motivated to combine them. A specific teaching or a specific principle must be stated that makes the combination obvious.

The need for specificity pervades this authority. See, e.g., *In re Kotzab*, 217 F.3d 1365, 1371, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000) ("particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed"); *In re Rouffet*, 149 F.3d 1350, 1359, 47 USPQ2d 1453, 1459 (Fed. Cir. 1998) ("even when the level of skill in the art is high, the Board must identify specifically the principle, known to one of ordinary skill, that suggests the claimed combination. In other words, the Board must explain the reasons one of ordinary skill in the art would have been motivated to select the references and to combine them to render the claimed invention obvious."); *In re Fritch*, 972 F.2d 1260, 1265, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992) (the examiner can satisfy the burden of showing obviousness of the combination "only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references"). *In re Sang Su Lee*, 277 F.3d 1338, 61 USPQ 1430 (Fed. Cir. 2002).

Appellants submit that (a) no specific showing of motivation to combine the references has been provided, and (b) that the references, even if combined, do not provide the claimed invention.

a. No Specific Showing of Motivation to Combine

The contention in the Final Office Action that it would be obvious to combine *Stein*, *Howard*, and *Dawson* is both legally and factually erroneous.

i. Factually, Stein does not suggest

Stein teaches a cell for use in non-volatile memory, including a MOS transistor 1 and a metal-nitride-oxide-semiconductor (MNOS)

capacitor 2 of Figures 1 and 3. The MOS transistor 1 of *Stein* is not connected as a decoupling capacitor as per the present invention: instead, the MOS transistor 1 of *Stein* is connected as an active switching device whose gate electrode is connected to a word line 10. Any special capacitance disclosed in *Stein* is embodied in MNOS capacitor 2. A MNOS capacitor is not a MOS transistor and hence is irrelevant to the present claimed invention. Enhancing the structure of MOS transistor 1 for use as a decoupling capacitor is not at issue in *Stein*, hence there is no intrinsic teaching that such enhancements would be useful.

The entirety of the explanation from the Office Action of why a MOS transistor with any desired gate work function should be added to *Stein* reads as follows:

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to make Stein's device with any desired gate work function as described by Dawson. (Dawson col. 2 line 49, Dawson in col. 4 lines 52-67 and col. 5 lines 1-15 also describes diffused gate material).

Final Office Action dated 06/04/2003, Page 4.

The Office Action makes no explanation whatsoever as to why the use of the chemical compounds purportedly disclosed in *Howard* would be useful when added to the MOS transistor 1 of *Stein*. As mentioned above, enhancing the structure of MOS transistor 1 for use as a decoupling capacitor is not at issue in *Stein*, hence there is no intrinsic teaching that such enhancements would be useful.

ii. Legally, burden not met

Furthermore, appellants submit that the evidentiary burden for an obviousness rejection has not been met. The Federal Circuit was specific in its admonitions in In re Sang Su Lee. Particular factual findings are required to underpin a §103 rejection. Here, the Final Office Action only makes the conclusory statement that “[t]herefore it would have been obvious to one of ordinary skill in the art at the time of the invention to make Stein’s device with any desired gate work function as described by Dawson. (Dawson col. 2 line 49, Dawson in col. 4 lines 52-67 and col. 5 lines 1-15 also describes diffused gate material).”

No factual basis is given as to why someone would be motivated to add modifications to the MOS transistor of *Stein*, particularly in view of the fact that *Stein* used the MOS transistor 1 as an active switch controlled by a memory word line 10. What is the motivating factor? Moreover, motivation to combine the purported work function of *Dawson* or the PtSi of *Howard* to the MOS transistor of *Stein* as claimed in the present application is necessary. Without an evidentiary basis upon which to draw this conclusion, the conclusion cannot stand.

b. Even if Combined, *Stein*, *Howard*, and *Dawson* Do Not

Meet the Claim Limitations

i. Group I

As discussed above, appellants submit that insufficient motivation exists to combine the *Stein*, *Howard*, and *Dawson* references. Even assuming, however, that such a combination is made, the combination itself does not include all of the elements and limitations of appellants' claims.

Claim 2 stands rejected as being anticipated by *Stein* and *Dawson*. The MOS transistor 1 of *Stein* discloses no "metallic gate electrode coupled to apositive voltage source" as recited in pertinent part in claim 2. Instead, the MOS transistor 1 of *Stein* is connected to a memory word line 10, which is a signal trace and not a power supply trace connected to a positive voltage source.

Claim 2 further recites in pertinent part "wherein said metal-oxide-semiconductor transistor includes the diffused gate region formed from material with a work function less than - 0.56 volts." In the Office Action, it is stated that "Dawson in col. 2 lines 48-50 describes the formation of IGFETs with any desired gate work function to form devices with low gate resistances." However, appellants have not found any such technical disclosure in *Dawson*. *Dawson* col. 2 lines 48-50 actually

recites “Accordingly, a *need exists* for a method of fabricating an IGFET that provides a low resistivity gate with the desired work function.” (Appellants’ emphasis added.) Appellants submit that this statement of a *need existing* is not an *enabling disclosure* of forming a gate with any *particular* work function. The only other use of the expression “work function” in *Dawson* occurs at col. 2, lines 19-20, which recites “Polysilicon, on the other hand, has a *known work function...*” And appellants’ claimed invention is a *replacement for* the prior-art polysilicon used in a gate.

Claim 2 further recites in pertinent part “metallic source electrode and a metallic drain electrode coupled ... to each other and to a negative voltage source.” Neither the MOS transistor 1 of *Stein* nor the various MOS transistors of *Dawson* show the drain connected to the source and both then connected to a negative voltage source. Indeed the MOS transistor 1 of *Stein* could not perform its switching function were this to be true.

Appellants submit that *Stein* and *Dawson* considered together do not disclose all of the claim elements and limitations of present claim 2. Therefore appellants submit that the invention claimed in claim 2 is not anticipated by *Stein* and *Dawson*, and therefore that claim 2 is allowable over the prior art of record.

Claim 3 stands rejected as being anticipated by, among others,

Howard. In the Office Action, a reference is made to *Howard* col. 3, line 31. However, appellants point out that the only place where *Howard* cites the use of platinum silicate (PtSi) is as part of *bottom electrode* 13, directly or indirectly coupled to the substrate 11. *Howard* does not show the use of platinum silicate as a “material of said diffused *gate region*” as recited in claim 3. Indeed, *Howard* only shows the use of platinum silicate in a bottom electrode 13 of a multi-layer capacitor 10 of Figure 1, not as a gate of a MOSFET. The multi-layer capacitor 10 of *Howard* requires a complicated dual-layer (or triple-layer) dielectric 14 consisting of a leakage prevention layer 18 and a high dielectric layer 17. This usage in *Howard* would if anything teach away from the use of platinum silicate in a more simple structure as disclosed in claim 3 of the present application. Because *Howard* does not teach the use of platinum silicate in a diffused gate region, and further because claim 3 depends from allowable claim 2, appellants submit that claim 3 is allowable over the prior art of record.

Claim 4 stands rejected as being anticipated by, among others, *Howard*. The Office Action states that the chemical compounds or elements tantalum nitrate (TaN), iridium (Ir), nickel (Ni), and arsenic (As) are disclosed in *Howard* at col. 3, lines 30-34. Appellants have downloaded a softcopy of *Howard* and performed word searches, but cannot find any reference to *any* of these compounds or elements in

Howard. Therefore appellants submit that the claimed invention of claim 4 is not anticipated by *Howard*. Since claim 4 depends from allowable claim 2, and further since claim 4 is not anticipated by *Howard*, appellants submit that claim 4 is allowable over the prior art of record.

Appellants point out that no separate rejections of claims 5, 6, and 7 were made in the Office Action. Appellants submit that claims 5, 6, and 7 are allowable as depending from allowable claim 2.

Claim 20 stands rejected as being anticipated by *Stein* and *Dawson*. Claim 20 recites in pertinent part “a metallic gate electrode to couple to a positive power supply voltage.” In the Office Action, on page 4, it is stated that “Stein describes an apparatus including a metallic gate electrode to couple to a positive power supply voltage (Stein fig. 2).” Appellants again point out that the MOS transistor 1 of *Stein* has its gate electrode connected to the word line 10, which is a signal trace and not a power supply trace to couple to a positive power supply voltage.

Claim 20 further recites in pertinent part “a diffused gate region formed from a material whose work function is less than minus 0.56 volts.” In the Office Action, again on page 4, it is stated that “Dawson in col. 2 lines 48-50 describes the formation of IGFETs with any desired gate work function to form devices with low gate resistances.” As mentioned above in connection with claim 2, appellants have not found any such technical disclosure in *Dawson*. *Dawson* col. 2 lines 48-50

actually recites “Accordingly, a *need exists* for a method of fabricating an IGFET that provides a low resistivity gate with the desired *work function*.” (Appellants’ emphasis added.) Appellants submit that this statement of a *need existing* is not an enabling disclosure of forming a gate with any particular work function. The only other use of the expression “work function” in *Dawson* occurs at col. 2, lines 19-20, which recites “Polysilicon, on the other hand, has a *known work function*...” And appellants’ claimed invention is a *replacement for* the prior-art polysilicon used in a gate.

Appellants submit that *Stein* and *Dawson* considered together do not disclose all of the claim elements and limitations of present claim 20. Therefore appellants submit that the invention claimed in claim 20 is not anticipated by *Stein* and *Dawson*, and therefore that claim 20 is allowable over the prior art of record.

Claim 21 stands rejected as being anticipated by, among others, *Howard*. In the Office Action, a reference is made to *Howard* col. 3, line 31. However, as mentioned above in connection with claim 3, appellants point out that the only place where *Howard* cites the use of platinum silicate (PtSi) is as part of *bottom electrode* 13, directly or indirectly coupled to the substrate 11. *Howard* does not show “said material is platinum silicate” as recited in claim 21, referring to “a diffused gate region formed from a material” as recited in independent claim 20.

Indeed, *Howard* only shows the use of platinum silicate in a bottom electrode 13 of a multi-layer capacitor 10 of Figure 1, not as a gate of a MOSFET. The multi-layer capacitor 10 of *Howard* requires a complicated dual-layer (or triple-layer) dielectric 14 consisting of a leakage prevention layer 18 and a high dielectric layer 17. This usage in *Howard* would if anything teach away from the use of platinum silicate in a more simple structure as disclosed in claim 21 of the present application. Because *Howard* does not teach the use of platinum silicate in a diffused gate region, and further because claim 21 depends from allowable claim 20, appellants submit that claim 21 is allowable over the prior art of record.

Claim 22 stands rejected as being anticipated by, among others, *Howard*. The Office Action states that the chemical compounds or elements tantalum nitrate (TaN), iridium (Ir), nickel (Ni), and arsenic (As) are disclosed in *Howard* at col. 3, lines 30-34. As mentioned above in connection with claim 4, appellants have downloaded a softcopy of *Howard* and performed word searches, but cannot find any reference to *any* of these compounds or elements in *Howard*. Therefore appellants submit that the claimed invention of claim 22 is not anticipated by *Howard*. Since claim 22 depends from allowable claim 20, and further since claim 22 is not anticipated by *Howard*, appellants submit that claim 22 is allowable over the prior art of record.

Claim 23 stands rejected as being anticipated by, among others,

Stein. Since claim 23 depends from allowable claim 20, appellants submit that claim 23 is allowable over the prior art of record.

Appellants respectfully submit that all the claim elements and limitations of the pending claims are not disclosed in the combined *Stein*, *Howard*, and *Dawson* references. Therefore appellants submit that a proper *prima facie* case of obviousness has not been made out in the Office Action mailed 06/04/2003.

Conclusion

Appellants respectfully submit that all claims now pending are in condition for allowance. Such action is earnestly solicited at the earliest possible date. If there is a deficiency in fees, please charge our Deposit Acct. No. 02-2666.

Respectfully submitted,

Date: 25 March 2004 
Dennis A. Nicholls, Reg. No. 42,036

12400 Wilshire Boulevard
Seventh Floor
Los Angeles, CA 90025-1026
(408) 720-8598

IX. Appendix A: Claims Involved in Appeal (Clean Copy)

1 1. (Cancelled).

1 2. (Previously presented) An apparatus, comprising:

2 a metal-oxide-semiconductor transistor;

3 a metallic gate electrode coupled to a diffused gate region of said
4 metal-oxide-semiconductor transistor and to a positive voltage source;
5 and

6 a metallic source electrode and a metallic drain electrode coupled
7 to said metal-oxide-semiconductor transistor and to each other and to a
8 negative voltage source, wherein said metal-oxide-semiconductor
9 transistor includes the diffused gate region formed from material with a
10 work function less than -0.56 volts.

1 3. (Previously presented) The apparatus of claim 2, wherein said
2 material of said diffused gate region is platinum silicate.

1 4. (Previously presented) The apparatus of claim 2, wherein said
2 material of said diffused gate region is selected from the group
3 consisting of tantalum nitrate, iridium, nickel, and arsenic.

1 5. (Previously presented) The apparatus of claim 2, wherein said
2 metal-oxide-semiconductor transistor includes a heavily-doped
3 substrate area.

1 6. (Previously presented) The apparatus of claim 2, wherein said
2 metal-oxide-semiconductor transistor is a p-channel device.

1 7. (Previously presented) The apparatus of claim 2, wherein said
2 metal-oxide-transistor is an n-channel device.

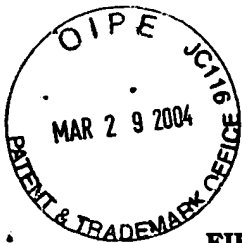
1 15. through 19. (Cancelled)

1 20. (Previously presented) An apparatus, comprising:
2 a metallic gate electrode to couple to a positive power supply
3 voltage;
4 a diffused gate region formed from a material whose work
5 function is less than minus 0.56 volts;
6 a gate insulator area;
7 a channel area coupled to said gate insulator area;
8 a diffused drain area coupled to said channel area; and
9 a diffused source area coupled to said channel area.

1 21. (Previously presented) The apparatus of claim 20, wherein
2 said material is platinum silicate.

1 22. (Previously presented) The apparatus of claim 20, wherein
2 said material is selected from the group consisting of tantalum nitrate,
3 iridium, nickel, and arsenic.

1 23. (Previously presented) The apparatus of claim 20, further
2 comprising a substrate which is heavily-doped.



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